IN MEMORIAM

John Adam Ryder

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John A. Ryder

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Committee in Charge of Publication.

Edward D. Cope, Ph. D.,
Representing the American Philosophical Society.

Amos P. Brown, Ph. D.,
Representing the Academy of Natural Sciences of Philadelphia.

J. Percy Moore,
Representing the United States Commission of Fish and Fisheries.

Philip P. Calvert,
Representing the University of Pennsylvania, Secretary of the Ryder Memorial Meeting.

John Adam Ryder.

Born near Loudon, Franklin County, Pennsylvania, February 29, 1852.

Educated in the schools of the neighborhood of his birthplace; at Vineland, New Jersey, 1867; at the State Normal School, Millersville, Pennsylvania, 1867–1869 and summers of 1870–1874.

Taught in country schools near Loudon, Pennsylvania, winters of 1870–1874.

Jessup Fund student at the Academy of Natural Sciences, Philadelphia, October, 1875–March, 1880.

Embryologist to the United States Fish Commission, April, 1880–autumn of 1886.

Professor of Comparative Embryology in the University of Pennsylvania, October 6, 1886–March 26, 1895.

Received the Honorary Degree of Doctor of Philosophy from the University of Pennsylvania, June, 1887.

Died in Philadelphia, March 26, 1895.

MEMORIAL MEETING.

A meeting in memory of Professor Ryder, participated in by members of the University of Pennsylvania, the Academy of Natural Sciences of Philadelphia, the American Philosophical Society and the United States Fish Commission, and others, was held in the hall of the Academy, Logan Square, Philadelphia, on the evening of Wednesday, April 10, 1895, at 8 o'clock.

The meeting was organized by the appointment of General Isaac J. Wistar as Chairman, and Philip P. Calvert as Secretary.

The Chairman in taking the chair said: "This meeting has been called by the Faculty of the School of Biology of the University of Pennsylvania on behalf of a number of the scientific institutions of the city, to consider and express its sense of the great loss that has been sustained by them and by the cause of science and learning at large, in the recent death of Professor John Adam Ryder.

"That accomplished biologist and true and loyal friend has been taken from us in the prime of his age and the ripeness of his genius, just as he was approaching, or rather arriving at, the fullness of a world-wide and well-deserved scientific fame. But there are present here this evening so many eminent men who are critically familiar with his researches and discoveries, that it is unnecessary for me to consume your time by any observations that will come far more forcibly from them.

"I therefore simply announce, that this meeting having been duly organized, is now prepared to receive such appropriate communications as may be submitted, and to take such action as it may deem proper."

FIRST ADDRESS.

DR. RYDER'S RELATIONS TO THE ACADEMY OF NATURAL SCIENCES.

BY DR. HARRISON ALLEN.

In 1875, exactly one score of years ago, John A. Ryder began his work at the Academy. Six of these years were spent in the service of the Government. The remaining fourteen were in close communion with these halls. The museum and library were the scenes of his many labors.

At one time his friends feared that he was covering too large a field. Doubtless, the fear would have been sustained if Ryder had pursued his studies along conventional lines. But we must not judge him by such a standard. His mental attitude was well poised. The objects that "swam into his ken" came from a wide space. So long as he was searching for the results of vital forces on the economy, it mattered little to him whether it was the teeth of mammals, the tails or scales of fishes, or the movements of protoplasm in a rhizopod that illustrated these actions.

While arranging the collections of the Academy as a Jessup Fund student, he found material for his studies in teeth of quadrupeds; while on excursions in the city park, in the smaller articulated animals feeding on fungi or swimming in the pools; while on the Fish Commission, in the oyster and its parasites and the movements of fishes; as professor of histology and embryology at the University, in the preparation of specimens for courses of instruction.

What were the mental forces that operated in Ryder to make him what he was? This is of interest, for the result of comparative studies is to aid us in knowing ourselves. How strange is the phenomenon! First, a young student coming to the Academy so absolutely unknown that his first application to a position on the Jessup Fund was deferred. Second, his obtaining the position and setting to work on the collection, re-arranging and cleansing specimens, re-filling jars and cataloguing. Third, after a career of four years attracting the attention of Professor Baird and

leaving the city to accept an appointment on the Fish Commission. Fourth, returning to Philadelphia in 1887 and again in frequenting the Academy, no longer working on its collections, but consulting its library and speaking at its meetings as a University professor. So we find Ryder at the beginning and at the end of his career part of the Academy. But where, in this chain of circumstances, do we find the factors which gave to Ryder those things which distinguished him? Almost precisely the same conditions (so far as the Academy and the University were concerned) were met with in Leidy. Yet how different were the two men! Indeed, so little did Leidy understand Ryder that he endeavored (with the most kindly motive) to dissuade him from a career of study. Leidy knew that men who are dependent on science for a livelihood secure fewer prizes in the struggle for maintenance than do those in any other learned calling. This statement is yet true, and it had special force twenty years ago.

Thus while the Academy gave Ryder incalculable aid (the soil, indeed, in which he grew), the influences which determined the character of his work were extraneous. These were in brief the influences of the theory of evolution as applied to living things, which brightening the horizon of science relieved it of all mists, such as the theories of Oken and its many variants, before men of Ryder's age looked toward the dawn for inspiration.

In America, to use Professor Packard's expression, a neo-Lamarckian phase of the theory of evolution arose. It held to an insistence of mechanical causes in modifying the shapes of organisms. Its advocates were Alpheus Hyatt and Edward D. Cope, men whom Darwin did not understand, but Ryder did; and, while he is in no respect a disciple to either of these distinguished men, his career was in a sense determined by them.

The forces which Ryder so eagerly studied were those which tended, as he believed they did, to modify endlessly the bodies in which they are exercised. The living body is compared by him to a machine in motion, which changes the shape of the machine itself by virtue of the motions; he believed that such changes are transmitted to offspring, and in this way organisms tend to endless variation. Nothing is fixed but the initial necessity to change.

Dr. Ryder might have done well had he confined himself more than he did to the study of species and genera. His papers

in this line were excellent. He announced several forms of Thysanura, Myriapods, fresh water crustaceans, and a new fresh water polyp. He revised the account of the sturgeons of our eastern waters, and resuscitated Le Sueur's *Accipenser brevirostris*, an old specimen of which (probably part of the material on which the species was named) was found by Ryder in the Museum of the Academy.

In competent hands the elucidation of species is not, as it has opprobriously been said to be, a dullard's task of taking an inventory of nature, but the study of the ultimate forms which those organisms assume which breed true. The shifting of color-schemes, the exhibition of the effects of retardation or precocity in the development of the individual, the effects of food and climate on size in whole or in parts, and of other causes by which minute differentiations are started and maintained, are of unending interest, and worthy of the best powers of the naturalist. If Ryder had been more closely identified than he was with the careers of the great academicians who had preceded him, he would in no whit have detracted from the value of his philosophical labors. One cannot but regret, if for no other reason than for his health's sake, that he discontinued those fruitful excursions to our woods, ponds and rivers, by which he contributed so notably to our micro-fauna.

With nameless regret, we note in what degree his exceptional powers were wasted. We see him in training as an oyster culturist, or busy with details of affairs on the Fish Commission. We see him giving his substance of energy to undergraduate instruction. Why do we insist that penknives are appropriate tools to fell oaks? that pedagogy is a suitable career for a man who has rare gifts for investigation? We may never see, nor the world see the like of Ryder again. Why did we not get all that was possible from him while he was here, and leave the tasks of teaching undergraduates to those equally earnest with himself, to teachers as capable as himself, but who did not possess a tithe of his ability as an inquirer after truth? Teaching it is true gave him his maintenance, one which he preferred to any other. Alas! that there is no larger Jessup Fund for matured students as well as tyros! No complaint is here made that as compared with other students Ryder had not received due consideration. Nevertheless,

bureau employment and teaching are not the best uses to which we can put exceptionally endowed men. Ryder was patient and dignified. He was not a Pegasus chafing in his harness, but as one consecrated to the calling of his choice, and on whose heart the lowliest duties on itself did lay. But we are the losers. We cannot but be saddened, at the knowledge that he did not live to put in form and substance the results of his profound labors. His work is like an unfinished house webbed in scaffolding, with heaps of building material scattered about the ground. The spirits to which Ryder's was kin (the Keats, the Mozarts), visit us at long intervals, and when they come, we treat them as though they were ordinary mortals after all.

The following telegram and letter were read:

WASHINGTON, April 10, 1895.

RYDER MEMORIAL COMMITTEE,

Academy of Natural Sciences, Philadelphia.

Regret that absence of Commissioner McDonald prevents his attending memorial meeting to-night.

HERBERT A. GILL,

Acting Commissioner U. S. Fish Commission.

DEPARTMENT OF BIOLOGY, COLUMBIA COLLEGE.

NEW YORK, April 9, 1895.

EDWARD J. NOLAN, Secretary,

Academy of Natural Sciences, Philadelphia.

My dear Sir: I deeply regret that a broken arm will prevent me attending the meeting upon Wednesday, April 10, in memory of my highly esteemed friend, the late Professor John A. Ryder. I write to express my deep sense of personal loss in the man who had so many attractive qualities, and my feeling that American biology has suffered a heavy blow. Professor Ryder was a man of rare qualities of mind and spirit; his work was full of the marks of real genius. Many of us have experienced the inspiration springing from his unusual suggestiveness, besides drawing largely from his solid observations of fact, both in embryology and in the subject of animal mechanics, of which he had made such an exhaustive study. On behalf of my colleagues at

Columbia and the New York Academy of Sciences, Professor Wilson, Dr. Bashford Dean and others, I desire to extend the most sincere sympathy with the loss which the Philadelphia Academy and the University of Pennsylvania have sustained in the death of Professor Ryder, who had hardly begun to complete his work. I am,

Very respectfully yours,
HENRY F. OSBORN.

SECOND ADDRESS.

DR. RYDER'S WORK WITH THE UNITED STATES FISH COMMISSION.

BY DR. BASHFORD DEAN.

It is my privilege to-night, ladies and gentlemen, to speak of the work of Professor Ryder on the behalf of the United States Commission of Fisheries.

And it is by no means an easy task to state briefly the importance of his long services to this department of the government, for one cannot forget that he has given his best years and his best work for its advancement. During the past twenty years Dr. Ryder has been one of the most faithful contributors to its scientific researches: his publications have identified themselves with the Fishery Commission, and have notably helped to give its reports and bulletins a standard value among the zoologists at home and abroad.

I have heard it said that Dr. Ryder had in his scientific work grown up with the Commission; it might, I think, be said even as justly that the Commission had in a measure grown up with him. Those who have not followed the history of the Fish Commission cannot appreciate the difficulties encountered by Professor Baird in its organization, not only in creating the interest in its behalf to prompt the necessary governmental support, but even more difficult, to make its aims at once practical and scientific; to teach the community that in order to make the Fish Commission of actual value it was necessary to know more thoroughly the subjects it dealt with: of the living, feeding and breeding habits of the fish, and in turn of their food organisms. To have dealt

only with the practical side of the problems would have been inimical to the practice as well as to the theory of the Commission; those who had studied the problems of the work would have shown clearly the fallacies of so short-sighted a course.

It was the good fortune of Professor Baird and of the Commission that Dr. Ryder was called upon to participate in its work; for there had been found one who could at once foresee the situation and encounter it. The subjects of his investigation dealt with the most practical matters, but their treatment was noteworthy in its scientific value. Thus while his studies on the life history of the oyster gave applications of great value to the oyster culturists, his results on the purely embryological side were of no less importance. And while his studies on the breeding and development of the food fishes were most fruitful in their practical results, they threw a flood of light on some of the obscure problems of vertebrate embryology. And it is profoundly to his credit that in all of his many researches he had never lost to sight the search of the *natural laws* in his quest for the practical. His was the true spirit of research, and it is significant, perhaps, that in his very last paper in the Commission's *Bulletin* he expressly formulates the position of the biologist, quoting from Emerson that "to a sound judgment the most abstract truth is the most practical." He might well show that without the study of the purely scientific problem of "spontaneous generation" there might have been to-day no antiseptics in surgery.

Dr. Ryder's contributions to the publications of the Commission were voluminous, as many as a half dozen memoirs to a yearly volume. Their scientific merit is attested by the many references to them in the kindred researches of every land. But the care he exercised in their preparation can only be appreciated by the zoologists, and by those especially who have known him at his work.

In his relations with the Commission, Professor Ryder merited the entire confidence and esteem of every one connected with it—from the commissioner to the humblest attendant—this, perhaps, he had owed as much to his personality as to his efforts. During the administration of Professor Baird what was practically the entire charge of the investigation of the living habits of fish and shellfish was intrusted to his care; the Wood's Holl Station was

placed in his charge, and in the smallest details his suggestions were followed. And after the death of Professor Baird, when Colonel Marshall McDonald was placed at the head of the Fish Commission, the personal relations of Dr. Ryder to the Commission were even, if possible, more closely drawn. To the younger zoologists, Professor Ryder was always the warmest friend, aiding them in their work, never too busy to counsel them, and always with a store of information regarding remote references, or analogies, pertinent in their present work. And in this regard, I myself, as well doubtless as many others here to-night, shall ever have the most grateful memories. Indeed, I know that when the studies encroached on his particular work, so far from sparing of his own results, he would go out of his way to afford the others his assistance and advice.

In short, one who had known Professor Ryder, could not help noticing that he was one out of a multitude in the purpose and method of his studies. His efforts, his ceaseless diligence, his enthusiasm were centred in his work—his personality was forgotten, and his aims were ever for the *cause* of biological studies. His life was a time to work, a time to get better, more truthful, more important results, not a time in which to build for himself monuments. His own results of study when long past, were allowed to disappear until they were needed in a kindred research. When I was last with him at Wood's Holl, he half promised to collect a complete list of his publications relating to fishery subjects, for the benefit of the younger workers, but he had long demurred saying that he had not retained copies of his own writings, that it would not be an easy matter to collect the scattered references, and that in fact, he doubted whether the result would be worthy of the effort.

The Fish Commission cannot, I feel, pay too warm a tribute to his memory. His talents, his faithfulness, his personality, will surely live ever in the minds of his colleagues. And what his offices were to the Commission, will not be less worthily esteemed as years pass by.

Third Address.

DR. RYDER AND THE SCHOOL OF BIOLOGY, UNIVERSITY OF PENNSYLVANIA.

BY DR. HORACE JAYNE.

It is surely most fitting that a few words should be said concerning the events connected with Dr. Ryder's coming to the University, and that phase of his life and work which is only known to those who were associated with him when he began his career as a teacher in that institution. At the close of the college year of 1886, the success of the attempt to establish a School of Biology at the University had been demonstrated. It was the close of the first full year, for the Laboratory building was completed so late in the session of 1884–85, that few students—other than those already in attendance—could avail themselves of its privileges, and it was not until the autumn of 1885, that we had what might be called an entering class. The experience of the year had shown clearly our educational opportunities, and had pointed out the needs of the students and our deficiencies.

It was seen that a large and attractive field of work lay open for us, a field that existed in few institutions, and one that would well repay careful cultivation. The work was to prepare students by biological instruction for the subsequent study of medicine. The neighborhood of a large medical school and the fact that upon our staff of teachers were many of its graduates, most of whom were also engaged in teaching medical students, naturally pointed out the need of such elementary courses in comparative anatomy and botany for medical students, as well as for those fitting themselves for medical studies. It was decided to enter upon this special field. An introductory course in microscopic mammalian anatomy was established, and the zoological and botanical work was adjusted with this end in view. It was then seen that a course was needed which would give the student a thorough knowledge of comparative microscopic anatomy, together with the development of the tissues and of the different kinds of animal forms. Such courses were needed also for the students who were pursuing biological subjects for their own sake with a view to research or

subsequent teaching. A new man was to be secured to take charge of these subjects, and fortunately for us that new man was John A. Ryder.

His connection with the school had been hoped for from its inception, but of that he of course was ignorant. I had known him for some years. We met for the first time while he was a Jessup student in this Academy, and I was engaged in arranging part of the collections of the Entomological Society. He impressed me at that time with his fund of information on all topics, and his ardent zeal for study. Later, as a medical student, I was directed to him as the only person in Philadelphia familiar with the methods of paraffine embedding and the cutting of serial sections.

During the winter of my residence at the Johns Hopkins University, on frequent trips to Washington, I had a favorable opportunity for knowing Dr. Ryder better. In the discussion of plans for the establishment of a biological school which began about this time, his name was frequently mentioned, and always with affection and with the hope that some day he might be with us.

His appointment was not therefore a new idea, nor was it dictated solely by our thorough appreciation of his ability and scientific reputation. It was the wish of his friends, that one who received his training in Philadelphia and in these halls, should be retained for Philadelphia and freed from outside cares, be able to develop his own work and extend his career for which he gave so much promise. How well he accomplished that you have already heard.

I was requested therefore to see Dr. Ryder, who was then in charge of the Fish Commission laboratories at Wood's Holl, and given authority to secure him if he felt like leaving his government position to enter upon educational work. After carefully weighing the question he decided in our favor. He hesitated at first, it is true, because he mistrusted his power to teach and handle large classes of students—a mistrust which was never shared by his friends. His quiet dignity of manner, his absorption in his subject, his desire to make very difficult subjects clear, all had their effect upon his students, and I never had report of the slightest disorder in his class-room or disrespect to him whom they loved to call "Uncle Jack." His position was in some ways an

enviable one and gave him much leisure for original research. During the earlier years of his connection with us he taught six hours a week in the laboratory, one term on histology and one term on embryology, but gradually this increased by the development of advanced work and original research by graduate students. This was of special interest to him and every point made by his students was reported to his colleagues with the same gratification as if discovered by himself. He was essentially a teacher. At first he seemed to "talk over the heads," of the students in his elementary classes. He fully recognized this difficulty and spoke freely concerning it. This he modified to some extent as time went on, but he purposely retained an unusually high standard.

Every trust confided to him was cheerfully and promptly performed. He was regular in his attendance upon faculty and committee meetings, and I think never was absent without first asking if especial business that needed his attention would be brought up. He was exact and prompt in his reports of students and spared no pains in presenting the claims of his department in attractive shape for publication. It was a pleasure to work with him for the advancement of the biological teaching and research in Philadelphia, and his sound views, and advice will be missed by all those who have that object at heart.

Of his traits as a colleague Dr. Wilson will speak. But even those of the faculty whose lines of work separated them widely from him, admired his learning and his devotion to science, and esteemed him for his gentle, kindly character.

Fourth Address.

DR. RYDER'S CONTRIBUTIONS TO THE DOCTRINE OF EVOLUTION.

BY PROFESSOR E. D. COPE.

Dr. Ryder's studies were prosecuted with the deepest mysteries of life ever before him, and he sought their explanation through the only hypothesis now available, the doctrine of evolution. His contributions to this subject were important. His mechanical talent led him to the explanation of the processes of creation on mechanical grounds; and his skill in unraveling

the mechanisms of nature gave him especial advantages in the pursuit. His work in this field may be divided into two periods. First, that in which he occupied himself with the molar conditions of structures and their probable causes; and second, the later one, in which he sought to measure the physical causes to which the recondite processes of growth are due. He was firmly persuaded of the insufficiency of natural selection as the sole factor at the basis of organic evolution, and opposed the first view of Weismann and the neo-darwinians that acquired characters are not inherited. He was even sometimes inclined to the doctrine that structures may be in some cases wholly due to mechanical causes operative in each generation by itself.

Taking up the development of his thought on these subjects, the papers of his first period may be classified as endeavors to prove the efficacy of use and disuse in modifying structures. He first in 1877 approached the problem of the cause of the reduction of the number of digits in the mammalia; the demonstration of the descent from four digits, and the hypothesis of the descent from five, having been already announced. He next applied the doctrine of use in explanation of the evolution of the enlarged incisor teeth of rodent mammals, in the same year. In the following year he published a more extended essay in which he showed the direct relation between the jaw movements of the ungulate mammalia, and the forms of the molar crowns, and advanced reasons why the former had probably produced the latter. In 1889 he showed that the segmentation of the soft rays of the fins of fishes are simply fractures due to flexures, and that in the caudal fin they possess approximately the same direction as the inter-myomeric fissures. In 1892 he proposed a mechanical hypothesis of the origin of the epidermic folds and scales of the fishes, which consists of a mathematical explanation of the results of folding, due to lateral flexures of the body, to which I called attention in the case of the segmentation of the vertebral elements of the Rhachitomous Stegocephali in 1884. As an incidental result of his embryological researches, he proposed a mechanical theory of the origin of the amnion in 1886; and mechanical explanations of the different types of placentæ in 1887. He announced the very probable view that the form of the placenta is dependent on the nature of its contact with the walls of the oviduct or uterus. His

latest work on this subject remains unpublished. This was a research as to the effect on embryonic growth of artificial strains to which he subjected the blastodermic tissues of the chick. He had already obtained interesting results. In the special discussion of the effects of disuse, his only paper is that on the coössification of the vertebræ of the gigantic extinct Glyptodons in relation to their unyielding carapaces.

If we now look to the attempts at a strict dynamical analysis of these phenomena, made by Dr. Ryder, we see him in a congenial field. He first in 1879, in the American *Naturalist*, published a paper on the "Ultimate Physical Unit of Living Matter," in which he considered the dynamical theories already in the field, and announced his adhesion to their intent and essence. He later elaborated his views on this subject in a paper entitled, "Energy as a Factor in Organic Evolution," in the proceedings of the American Philosophical Society for 1893. Here he expounded the effects of surface tensions in organic matter under energetic conditions, as a cause of segmentation; as had been already considered in the case of vegetable cells by Schwendener. His special applications of these views were made in a number of papers. One of the most important of these is a "Physiological Theory of the Calcification of the Skeleton." This is a highly original essay, and he finds a mechanical hypothesis sufficient to explain all the phenomena, the basis of the process being inherited. In 1893, he published a geometrico-mechanical explanation of the form of the fowl's egg.

Dr. Ryder's views on the inheritance of acquired characters were confirmed by his studies of the deformed gold carp of the Japanese, to which he devoted himself for a time, and the results of which he published. He also brought forward in confirmation of them, the observation of Von Brunn on the inheritance of worn molars in the rat.

While he did not regard natural selection as the fundamental factor in evolution, he did not deny its efficacy in many cases. In order to show the relation of different modes of life to the struggle for existence, he made a mathematical calculation of the chances of conflict under the various conditions of exposure to which organisms are subject. He showed that the range of difference is very great.

Finally, it may be asserted that Dr. Ryder's contributions to the explanations of the phenomena of animal evolution, have been of a degree of importance disproportioned to the short span of life which was his share. These contributions are characterized by acuteness and true discrimination. His work will be a guide to others, though few will probably equal him in the combination of mental qualities which rendered his work what it was. These are mechanical genius, and unflagging perseverance.

My association with Professor Ryder during the years of his residence in Philadelphia was close. Our lines of study crossed and recrossed; and I may say that in him, I found a colleague single-minded and fair, with whom it was always a pleasure to work. Our differences were amicable, as our agreements were hearty. Science has suffered a most serious loss in his early removal from her cult, and his friends have lost an ideal companion. My own knowledge of Professor Ryder dated from his entrance into the field, and it is only fitting to express my sense of personal loss, in words which express but little.

Fifth Address.

DR. RYDER AS A TEACHER.

BY MR. H. F. MOORE.

It is my sad duty this evening to speak of Dr. Ryder from the standpoint of one who was his student.

Of my own unworthiness to represent his students, past and present, this is neither the place nor the occasion to speak, but it is not without a certain melancholy satisfaction that I accept this opportunity to express publicly my deep sense of personal indebtedness to him and to his memory.

Those who have known him in other phases of his life have usually failed to appreciate his character as a teacher. Many who have heard his communications before the Philosophical Society, the Academy of Natural Sciences, or the Biological Society of Washington, have wondered at his fitness for the post which he has filled with signal ability for the past nine years.

Remembering his often abstruse communications before those learned bodies, it has seemed to them almost impossible that he

should be able to bring down the plane of his lectures to the level demanded by the requirements of undergraduate instruction.

Widespread as was this belief, it was nevertheless far from a true estimate. Speaking as one who was benefited by his elementary teachings, as one who availed himself of all that Dr. Ryder had to offer in his regular courses in histology and embryology, I can truly say that he in every way proved himself equal to the requirements of a difficult position.

What he may have lacked in some of the usual attributes of a successful teacher was more than amply compensated for by his keen sympathy, his painstaking care and his skill with crayon and pencil.

His blackboard sketches were a running illustration of his speech; his speech a living explanation of his drawings, and the two together served to make clear what either alone would have perhaps left bathed in obscurity.

There was a reality, a definiteness about his lectures which brought them home to us with a force which no perfunctory, second-hand instruction could have attained. He made us feel that he himself had seen things, and that we too could see and know them if we willed.

The clearness of his treatment of the development of the vertebral column, of its modifications and the mechanical problems involved, recurs strongly to mind after the lapse of years and such instances could be multiplied without number.

To illustrate points under discussion he drew freely upon his vast knowledge of all fields of biological research. Usually this method of treatment was of the utmost value to the earnest student, but it must be admitted that occasionally it defeated its own end by the very wealth of illustration.

During the past two years it has been Dr. Ryder's custom to occasionally address the Freshman class upon general biological topics—segmentation, effects of parasitism and similar subjects. These lectures were devoid of technicalities excepting such as had been previously explained, and being enlivened by his quaintly humorous illustrations were followed by the classes with profound attention. That the students appreciated these lectures and felt benefited by them, that, notwithstanding the newness of the subject, they were able to absorb and understand his teachings,

was manifested by the high terms in which they often referred to them.

Dr. Ryder's appreciation of his own ability as a teacher was extremely modest, as I had more than one occasion to learn. During my own undergraduate course, when I know that some of us at least were feeling especially grateful to him for the light which he had thrown upon our studies, he more than once expressed to his assistants his dissatisfaction with his own lectures and his disbelief in the efficiency of his own teaching. He was not the man to make such statements unless he believed them, and I was at the time much impressed by this insight into his character. In his class-room he strove, and usually with success, against his natural tendency to abstruseness which no one regretted more than himself. He had great admiration for men like Huxley and Tyndall who could write good science for the people. Shortly before his death we were conversing upon the vigor and the clearness of the writings of Professor Huxley, to whom Dr. Ryder referred, on account of the beauty and strength of his diction, as "the Shakespeare of English Science." He was deploring the technicalities with which scientific writings so often bristle and mentioning a well-known scientist he said, "that man has absolutely no regard for his readers," and after a pause he added, "I myself am much worse." It was this appreciation of his own limitations which enabled him to attain that success as a teacher of which so many thought him denied.

His devotion to the stupid men of the class was of the most conscientious character, and I have known or heard of at least two instances in which the recipients of his unceasing attention were exceedingly repulsive to the self-sacrificing teacher who sought to aid them.

To his more earnest students, the after-class hour, the hour of closer intercourse was always fraught with the greatest pleasure and profit. Then he permitted himself to be drawn out ; he opened up his vast magazine of intellectual good and whosoever sought could partake thereof. Then we as undergraduates saw him at his best and received our first insight into his true greatness, and at the same time, his true simplicity of character. He apparently enjoyed these little gatherings as much as we did and he often lingered with us while his meal grew cold at home.

It was in this hour that we gradually formed those feelings which we carried with us to our post-graduate work under his direction.

In the direction of these higher studies Dr. Ryder found his true forte both by nature and by training.

Here he could make his own personality more strongly felt: his contact with his students was closer and his influence proportionately greater. The stimulus of this close intercourse cannot be understood, cannot be appreciated by one who has not been under its sway, and it was in my opinion the most valuable, the most lasting benefit which we derived from him. The information he gave us might have been derived from another; his personality was his own.

Looking back upon three years thus spent with him it is difficult to pick out any one thing and say, "This did I obtain from him and from him alone." All that those years contained is pervaded by a consciousness of his influence; an influence which we admit with pride and gratitude.

To his older students and the younger members of the zoological faculty, Dr. Ryder's presence formed a large part of the life of the School of Biology. His face, it was, which most frequently first greeted us upon our entrance into the building. He once said that he knew the footstep of almost everyone connected with the place and it was his curious custom to come to his room door when a familiar tread sounded upon the stair.

If he had found a point of interest in his work, he usually invited us to enter, and would unfold to us his hopes and aspirations with the enthusiasm and simplicity of a youth. We were usually informed of the progress of the many investigations which he had under way, and we were thus made to feel the stimulus of his own activity.

As a guide and mentor to those attempting investigation in original fields, Dr. Ryder was invaluable. His information was always exact; it never went half way and left us in a slough deeper and wider than before. When necessary he carried us completely over and landed us safely on the other side; or, more frequently, he pointed out the stepping-stones by which we could pursue our way unaided.

If he had not the desired information himself he always knew

where to find it. His bibliographical knowledge was astounding even in fields in which he himself had done but little.

Never did we apply to him and find him wanting; rarely was the information sought not contained in the vast fund which was ever freely placed at our disposal. His health was never too poor, his time too precious, his own studies too exacting or important to cause him to turn a deaf ear to an appeal for assistance.

He spent a portion of the last two summers at Wood's Holl, where he delivered several lectures, which invited the earnest attention of students and professors alike. Although he had no official connection with the Wood's Holl Laboratory, the students gathered there from all the great colleges and universities of the East soon learned his worth, and his advice and assistance were sought and given unceasingly.

An account of Dr. Ryder's relations to his students would be incomplete, indeed, were it confined by college walls. His sympathy, his many kindnesses ceased not with the boundaries of his class-room, but were manifested in a thousand ways during the time which should in all justice have been his own. Wherever and whenever the occasion arose, with that utter self-abnegation, which was his foremost characteristic, he exerted himself in the interests of his students.

During the past summer, when the hand of pain and care bore heavily upon him, when he was suffering with ill health, the seriousness of which he failed to appreciate, he still had thought for those who had been under his guidance. From the midst of his own troubles he could still stretch forth the helping hand to aid a younger man on the road which he had chosen.

He entered to some extent into our social life, and this was particularly the case during the summer spent at the Marine Biological Laboratory at Sea Isle City. Rarely an evening passed that he was not with some of us, and into our social pleasures he entered as heartily as any. His fund of anecdotes was a varied one, and many a pleasant evening was passed by the oceanside listening to his stories of men and things.

Upon our return from the seashore some of the instructors and students began to hold fortnightly meetings, at the home of one of the number, for the discussion of general biological topics. To these meetings Dr. Ryder was invited and he soon became a

regular attendant. We undertook a critical study of Weissmann's "Essays on Heredity" a subject of which Dr. Ryder was a thorough master. Most of you are aware of the vigor with which he opposed the Weissmannian doctrines, yet we found no one keener to note or more willing to appreciate the good points of the argument, and these little meetings added much to the respect in which we held him.

Viewing him from so many sides, most of us grew to regard him with feelings which upon first acquaintance we would have supposed impossible. Loving him for his qualities of heart, trusting and respecting him for his absolute frankness, honoring him for his eminent qualities of mind, his death came to us with the shock of a personal bereavement and we now bow our heads in reverence to his memory and mourn his loss.

Sixth Address.

DR. RYDER AS A COLLEAGUE.

BY. DR. W. P. WILSON.

I desire to say a word about Dr. Ryder as friend and colleague in the University. I do this with pleasure, for during the seven years or more that we were in almost daily intercourse, I have only the most pleasant memories to look back upon.

I first met him in the latter part of 1887, at which time I came to the University and found him already actively engaged in instruction and investigation. I can remember well my first impressions. We had not talked five minutes before he had led me into the intricacies of one of the subjects which he was then specially studying, and related to me the possible effect of new discoveries in this direction.

At the very first meeting he showed his simplicity of life, his industry, his energy and his eye single for the discovery of new truth. I was drawn to him from the very first.

This, the first interview, showed me the broadness of his views; that he investigated and sought for new facts and truths in no narrow horizon. He neither limited his thought or his investigations to his own chosen field of zoology, but considered life as

a unit, as a whole, and often stepped outside of his own special domain to follow up the development of facts which, he saw in his broad vision, bore on the general development of his theories.

In his association with the Academy of Natural Sciences he formed a habit of hastily reviewing the great mass of valuable literature which finds its way to the library of this institution. Whatever approached his own special work he read with care. In his review of literature he collated facts from all directions.

His memory was an extraordinary one. Whatever he had read he retained. This was always of the greatest service to himself and his friends, for whatever question came uppermost or whatever investigation was under discussion, he could readily tell what had been written and what had been done.

Few men know the literature of their own chosen field as well as he knew his. In the warmth and excitement of debate over any topic in which he was deeply interested he had a most extraordinary command of the English language. The most complex and intricate terms replaced in the discussion the shorter Anglo-Saxon words.

He was well equipped in modern languages. German authors were his favorites, because more than all others they were working and publishing where he was most interested. The language seemed almost as natural as his own. I learned that in early life, when a mere child, along with his instruction in English, his grandmother gave him daily lessons in German. After his return from Germany he could not say enough in praise of the strong, sturdy German character, and the spirit of true investigation, there found on every hand, which seeks truth for its own sake.

He had a strong desire to popularize the natural sciences, and to secure their introduction into our school system, but the supreme bent of his mind for original investigation kept him aloof from this field of work.

In his discussions he was fair to his antagonist, and stated his opponent's views with clearness.

He desired full liberty of thought for himself and as fully accredited it to others. In his discoveries and investigations he did not recognize time nor days. In his general thought he was agnostic. All days spent in adding to his knowledge were days well spent. Whatever truth he arrived at became at once a part of

his mental stock of knowledge and was incorporated in his general theory of life.

He was an omniverous reader, and gleaned facts from all sources. The best anatomists, the best morphologists, the best embryologists and physiologists on all sides of life were searched for facts to add to his store. He appropriated these and harmonized them with his own views. Sometimes the new which came to him clashed with the old which he had thought true. He was very quick to balance, to compare, and to lop off from his theories that which had least support. He did not do this with regret, but seemed positively pleased to feel that he had gained something in advance of what he had once held.

He had no use for that kind of consistency which compels one to harmonize his thought of yesterday with that of to-day. It did not in the least trouble him that he had given utterance in his earlier writings to theories which he regarded later as untenable. This only showed that he was a studious, active, thinking, progressive investigator. It illustrated the principle that the discovery of every new truth has its retrospective influence on all that went before it as surely as all that follows it; that the leaven of a new truth is the centre of a rapidly widening circle, which soon includes all life and action.

But the most *prominent features* of Dr. Ryder's life, felt, I am sure, most strongly by his colleagues and intimate friends, with whom he came in daily contact, making indelible impressions upon us all, were the following:

1. His extreme simplicity of life and utter avoidance of all ostentation. He preferred his own quiet home, his laboratories at the Biological School, the Academy of Natural Sciences, and other localities where he met mainly his intimate friends, and pursued his chosen field of thought, either in actual investigation or in the presentation of carefully thought-out principles. He rarely accepted invitations which took him from these fields of activity. He shrank from all public demonstration or public life of any kind. He hated forms and ceremonies, and was sure not to appear where they were necessary. This was so much a part of the tendency of his mind that a dress occasion of any kind was distasteful to him, and made him ill at ease in mind, though not in appearance. A new garment or suit of clothes was a

disagreeable necessity, which only passed away when the apparel became adapted to, and was a part of the wearer.

What he did he did quietly from his own convictions and because it seemed to him best and right, with no mention of it to others. No part of his acts or his life was put forward in any way for show or observation of others.

2. His remarkable industry. He worked incessantly. He often went home at night with the bare suggestion in his mind of a new field of investigation. In the morning he returned with lines of argument marked out and with directions for investigation well stated. He began at once this new investigation. It mattered not how many other subjects were under treatment; they were all carried on from time to time as opportunity afforded, and week by week new and valuable papers were presented at the American Philosophical Society, the Academy and elsewhere for publication.

Those of us who had the pleasure of doing our work with him and meeting him in daily intercourse, know well the value of his life. It was a rare thing when we met him in the morning not to find him aglow with some newly discovered principle, or with some problem restated in better form, throwing light on the work which was nearest his hand at the time.

If anything stood in the way of his work, his perseverance and energy removed it. Impeded by a lack of knowledge in the higher mathematics or physics in carrying to their legitimate ends his theories in mechanical evolution, he immediately applied himself to these subjects and the difficulties vanished. His industry was supreme. He stimulated everyone to increased activity about him. You found yourself pushed along in your own work by the very force of the example before you.

But this very industry and energy which we so greatly admire, in the end did him lasting injury. He seemed not to be able to rest from his incessant investigations. When physically weak he continued to study and write on topics which interested him, to the exclusion of proper rest and recreation. His colleagues all urged him to spend more time out of doors in healthful recreation, but without avail.

During the last few months of his life I seldom met him that we did not discuss the revision or enlargement of papers already written or the production of new manuscripts, mostly on his

favorite subject of mechanical evolution. He had been at times during the winter writing a book which he hoped soon to publish, embodying his general views on evolution. The manuscripts for this work, I believe, were nearly finished.

3. The third great feature of Dr. Ryder's life was his incessant craving after new facts and new truths. As in olden times all roads led to Rome, so in his daily life and acts his main efforts were all directed in various lines of original investigation.

You could not remain long with him and not catch the spirit of this inspiration. From this point of view he was one of the most stimulating men I have ever met. He searched for new facts in every direction. The result was equally interesting to him whether it had any practical bearing or not. The bare, naked truth was sufficient. If it could be applied or not did not increase or diminish its value in his eyes. That which had been studied and investigated and stated as fact, had its greatest interest to him, in its relation to what was yet unknown.

By far the most interesting side of the University to him was its post-graduate work, where he could stimulate his students to original investigation. His undergraduate teaching, which he did with care, was done as one would learn a language, in order that it might open up the delightful unknown of the future.

4. Fourth, and strongest, among the principles which dominated his remarkable career, was his intense desire to formulate a harmonious theory of evolution and development of life. His whole time was spent in collating facts from others and in discovering new ones from his own investigations, in order that he might later bring all together in one grand system. He hoped to make this aggregation of facts and principles explain more fully the thinking, moving, existing universe about us.

Such a life as this, although apparently cut off in the very midst of its greatest activities, does not cease to render great service to mankind. Not one of us can think of the simplicity of his life and surroundings without being led to turn more strongly away from the mere shadow of things. Not one of us can contemplate his remarkable industry and energy without being stimulated to labor harder and longer in our chosen fields of work. Not one of us that has come within the reach of his grasp for new facts and truths but will be pushed on with more

persevering and higher aspirations, toward the solving of life's problems, parallel to his own. We shall accomplish vastly more with the ever-present thought of his achievements in our minds. Such an influence is immortal, for shall we not be inspired to pass the same great qualities on to those who follow us?

It is true we have lost a valuable teacher, a valuable friend and adviser, but his example and real life will remain forever with us.

On the conclusion of this address, Dr. J. M. Macfarlane moved that the addresses be referred to the secretary to confer with a committee consisting of representatives to be appointed by each of the bodies invited to take part in this meeting. The motion was adopted and the meeting adjourned.

PHILIP P. CALVERT,
Secretary.

Ryder 3172 Educat.B
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Author

Title In memorian John Adam Ryder

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